
तिजोरियाँ
भाग 2 चोरी से प्रतिरोध संबंधी परीक्षण
(छठा पुनरीक्षण)

Safes
Part 2 Tests for Burglary Resistance
(Sixth Revision)

ICS 13.310

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FOREWORD

This Indian Standard (Part 2) (Sixth Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Security Equipment Sectional Committee had been approved by the Mechanical Engineering Divisional Council.

Security equipment plays a vital role in secured storage of valuables and important documents. These are used in a wide variety of establishments like banks, commercial organizations, hotels, shops, etc. One of the most common and important security equipment is safe, popularly used to store cash, valuables and important documents.

The important change in this revision is:

- a) The total time within which a test attack is expected to be completed, is modified to 4 times of net working time.

This Indian Standard is published in 3 parts. The other parts in this series are:

Part 1 Specification

Part 3 Tests for fire resistance

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

SAFES

PART 2 TESTS FOR BURGLARY RESISTANCE

(Sixth Revision)

1 SCOPE

This standard (Part 2) lays down the methods of test for assessing the burglary resistance of the safes.

2 REFERENCE

The following standard contains provision, which through reference in this text constitutes provision of this standard. At the time of publication, the edition indicated was valid. All standards are subject to revision and parties to agreements based on this standard is encouraged to investigate the possibility of applying the most recent edition of the standard indicated below.

IS No.	Title
IS 550 (Part 1) : 2021	Safes: Part 1 Specification

3 TERMINOLOGY

For the purpose of this standard, the following definitions shall apply.

3.1 39 cm² Opening — This type of opening is defined as:

- a) A rectangular shaped opening 39 cm² in area with the smaller dimension 40 mm or greater,
- b) A circular opening 70 mm in diameter, or
- c) A triangular opening with at least a 50 mm dimension from the base to the peak.

3.2 13 cm² Opening — A rectangular shaped opening 13 cm² in area with the smaller dimension 25 mm or greater or a circular opening 40 mm in diameter.

3.3 Common Hand Tools

3.3.1 Chisels — Flat and sharpened with weight between 0.25 to 1.0 kg and length 200 to 300 mm.

3.3.2 Punches — Weight 50 to 100 g and length 100 to 150 mm.

3.3.3 Wrenches — Pipe wrenches fixed or adjustable, 15 to 25 mm dia and 225 to 450 mm length.

3.3.4 Spanners — Standard available double ended or ring spanners, fixed or adjustable, length 225 to 380 mm.

3.3.5 Screw Drivers — Dia 8 to 13 mm and total length 250 to 300 mm.

3.3.6 Pliers — Standard or combination, length 150 to 200 mm, weight 170 to 300 g.

3.3.7 Hammers, Sledges and Pickaxe — Head weight 1.7 to 3.5 kg and length 200 to 600 mm.

3.3.8 Pry Bars and Ripping Tools — Rod diameter 18 to 20 mm/or Hex 20 to 25 A/F and length 1 000 to 1 200 mm.

3.3.9 Hand Hacksaw — Blade Material — High Speed Steel (HSS) Length 250 or 300 mm (+/- 2 mm)

3.4 Impact Tools — Portable Electric Impact Hammer 25 mm size Rated 850 to 1 150 W, impact energy 10J Max, rated speed 1 300 to 2 900 bpm and with high speed steel (HSS) Chisel Length 300 to 450 mm, electric hand drills and hammer drills high speed steel (HSS) and carbide tipped 650 to 820 W, drill diameter 6 to 25 mm.

3.5 Pressure Applying Devices — Include portable drill presses, portable drilling jigs, or other types of drill holding mechanisms.

3.6 Portable Electric Drill — Electric hand drills including carbide tipped drills, 550 to 800 W, drill diameter 6 to 13 mm.

3.7 Power Saw — Include circular saws of 150 to 200 mm diameter, hole saws of 25 to 30 mm diameter and reciprocating saws rated 600 to 1150 W, blade length 150 to 200 mm.

3.8 Grinding Point — Include various shaped grinding points (cone, cylinder, disk and the like) driven by electric grinder. Rated 500 to 600 W, spindle diameter 3 to 8 mm and grinding point diameter 18 to 25 mm.

3.9 Abrasive Cutting Wheel — Metal or stone cutting abrasive wheel, to be used with electric angle grinders rated 2 100 to 2 600 W, thickness 1 to 6 mm, diameter 75 to 230 mm (grit size 46-80).

3.10 Cutting Torch — Oxygen-acetylene fuelled cutting torch, 180°(straight). Length 900 to 1 300 mm and nozzle diameter of 1.8 to 2.8 mm.

3.11 Deposit Bag — A bag constructed of canvas or reinforced plastic, that is provided with a closing mechanism.

3.12 Deposit Envelope — 241 mm × 114 mm or larger size business envelope.

3.13 Fishing — Introducing through the deposit mechanism, fishing tools that may be manipulated so as to grasp the deposit envelope, or bag, and then withdraw it.

3.14 Trapping — The use of trapping tools that may be introduced into the deposit mechanism in such a manner as to avoid detection by a depositor, in order to prevent the deposit from reaching the safe, the deposit can then be withdrawn after the depositor has left.

3.15 Fishing and Trapping Tools — Cardboard, plastic sheet, fish hooks, flexible spring shaft pick up fingers, lines, shim stock.

4 NET WORKING TIME

4.1 The networking time is the period during which an attack is in progress on the safe. It is to be exclusive of preparation time for test and time required for safety precautions and/or any other administrative requirement or break. Time shall be measured with granularity of 1 sec.

4.1.1 Measurement of Net Working Time

4.1.1.1 For each operation the stopwatch shall be started as the tool touches the test specimen and stopped when tool ceases to touch the test specimen, that is the time during which a tool is attempted to make changes in the specimen is considered as networking time.

4.1.1.2 The time period required to carry out the hammer attack shall not be counted by means of stopwatch. Instead, in case of manual hammer attack, each blow shall be counted as 1 s when hammer is used with one hand. For sledge hammers where both hands are used, each blow shall be counted as 2 s.

5 SAMPLE FOR TESTING

Samples known to be fully representative of a lot of safes of same design and construction, shall be subjected to tests. Such samples shall be selected on the basis of random sampling.

6 TESTS

6.1 Tests for verifying burglary resistance of safes consist of attacking the safe with the help of tools, oxyacetylene torch, explosive or a combination thereof.

6.1.1 The test serves to establish the burglary resistance of the safe in terms of net working time needed to gain access to the inside of the safe. A testing team

examines a test specimen together with the technical documentation and devises a programme of attacking the test specimen. The time taken to gain access by inserting a test block with cross-sectional shapes and dimensions as described in **3.1** and **3.2** and length 150 mm minimum, with suitable handle, shall be used to verify the openings made during test attacks is recorded and used to determine its class of resistance.

6.1.2 The tools and programme of attack used during testing shall be those most likely, in the opinion of the testing team, to result in the lowest net working time.

6.1.3 The object of the investigation is to estimate the resistance of a safe to burglary attacks by simulating a burglary situation under controlled conditions. For this purpose, a testing team as per **6.2** shall at a time, carry out an attack on the sample safe, using the specified tools, under the supervision of a test team leader. The attack team shall use protective safety clothing to avoid any accidental injuries.

6.1.4 Each attack on the safe shall be completed in one continuous operation, without any change in the team members. Once started, an attack shall be completed within 4 times the resistance time specified for that class of safe in Table 1. It shall be imperative on the testing team to complete the specified networking time within the time limit of 4 times. *Illustration:* Tool resistance time for a side of Class-C Safe is 10 min and for Door is 30 min. Hence an attack on any of the sides shall be completed in 40 min. Attack on Door shall be completed within 120 min.

6.1.5 All the planned attacks on any one safe shall be completed within two consecutive working days.

6.1.6 All the attacks shall be aimed at those points of the sides/door of the safe which do not contain hole by design, for example hole for handle, key, cable or anchoring.

6.2 Testing Team

A testing team shall consist of

- A team leader familiar with design and construction practices followed in the industry,
- Two operators skilled in operation of specified tools, and
- A time keeper.

NOTE — The Team Leader and the Time Keeper shall not participate in the operation of tools during the attack.

6.3 Test Equipment

6.3.1 The equipment used for the tests shall be from those listed in **6.3.2** to **6.3.6**.

6.3.2 Common hand tools, pressure applying devices, portable electric drills (*see 3.3 to 3.9* excluding **3.4**), fishing and trapping tools (*see 3.15*) may be used for checking tool resistance capacity of class D safe.

6.3.3 Common hand tools, impact tools (attacking with impact tools is applicable to classes BB, A, A+, AA, AAA and X safes only), pressure applying devices, portable electric tools and power saws (*see 3.3 to 3.9*) may be used for checking tool resistance capacity of safes.

6.3.4 Oxyacetylene torch (*see 3.10*) shall be used to check the torch resistance capacity of the safes where applicable.

6.3.5 For combined attack, any tool specified in **6.3.3** in conjunction with oxyacetylene torch shall be used (*see 3.3 to 3.10*).

6.3.5.1 During a test attack the following tools shall not be used simultaneously:

- a) Two electric powered tools (*see 3.4 to 3.9*), and
- b) Two thermal tools (*see 3.10*).

NOTES

1 Only standard shaped chisels of Steel, as supplied by the manufacturers are to be used. The use of balancers is not allowed in a tool attack test.

2 Tools to be kept ready before test as planned and not to be re-sharpened during test.

3 In the event of any tools getting damaged during a test, the same may be replaced by a fresh tool of the same specification.

6.3.6 Nitroglycerine (maximum 227 g) or other explosive providing the equivalent explosive energy.

6.4 Test Methods

Any of the methods of attacks specified below may be employed, either singly or in combination, at the option of the testing team, subject to the applicable limitations of tools and time specified elsewhere in this standard.

6.4.1 Drilling Lock Mechanism

An attempt shall be made to drill through the door to the lock box, lugs carrying bar or other parts of the mechanism, then release the bolt work by punching or prying.

6.4.2 Handle Forcing

An attempt shall be made to force the bolt operating lever by means of a pipe wrench or spanner applied to rotate the handle so as to free the lock connection.

6.4.3 Door Sledging and Wedging

An attempt shall be made to destroy or pierce the door by means of wedges, chisels and sledge hammers so as to give access to the contents of safe.

6.4.4 Creating of an Opening

A tool attack shall consist of an attempt to cut an opening as specified in **6.4.4.1** to **6.4.4.3**. The particular method of creating the opening shall be decided by the testing team.

6.4.4.1 Class D safes shall be able to resist making a 39 cm² opening (*see 3.1*) through door or front face.

6.4.4.2 Class C, CC and CCC safes shall be able to resist making a 39 cm² opening (*see 3.1*) entirely through the door or any face.

6.4.4.3 Class BB, A, A+, AA and AAA safes shall be able to resist making a 13 cm² opening (*see 3.2*) entirely through any face by tool or by combination of torch and tools.

6.4.5 Combination Lock (*Wherever Provided*) Drifting and Drilling

An attempt shall be made to knock off the combination dial, punch or drill the spindle and then release the lock mechanism by means of picking tools.

6.4.6 Fishing and Trapping (*Class D Safes*)

6.4.6.1 For the envelope fishing attempt, the deposit safe is to be loaded with 12 sealed business envelopes of size 241 mm × 114 mm. Each envelop shall be filled with flat sheets of paper to represent currency notes such that thickness of each filled envelop is between 6 to 13 mm.

6.4.6.2 For the deposit bag fishing attempt, the deposit safe is to be loaded with six canvas deposit bags that are filled with paper so that each sealed bag is 35 to 65 mm thick. The bags are to be standard deposit bags measuring 15 to 23 cm wide × 20 to 30 cm long or specially designed for the deposit safe being tested.

6.4.7 Oxyacetylene Gas Cutting Torch (*For Class, BB, A, AA, AAA and A+ and X Safes Only*)

Oxyacetylene gas cutting torch attack shall be carried out on the selected sample with an aim to open the door or make an opening entirely through the door/body for different classes of safes. This shall be combined with the impact hammer attack.

6.4.8 Explosive Attack

Class X safes shall resist making a 13 cm² opening (*see 3.2*) entirely through any face by tool or by combination of torch and tools and explosives as specified in **6.3.6**. 110 g of nitroglycerine or the amount of explosive providing the equivalent explosive energy is to be used in a single charge. Though the total quantity of explosive used in a succession of charges on one test sample has been fixed at 227 g, preliminary explosive tests may be made on a sample of material representing the door or body construction, or a second sample may be required, depending upon the number of points of attack requiring actual test for the complete determination of resistance to entry.

6.4.9 Other Type of Attacks

Any intelligent attack other than specified above may be conducted using tools specified for that class of safe, if it leads to opening of the door.

7 CRITERIA FOR ACCEPTANCE

The safes shall be considered to be conforming to the criteria for acceptance of this standard, if they successfully withstand the test for minimum net working time as specified in Table 1. For classes of safes, refer Table 1 of IS 550 (Part 1).

8 RECORDING AND REPORTING OF TEST RESULTS

8.1 The testing team shall maintain appropriate record of:

- a) identification of test specimen;
- b) date(s) and place of testing;
- c) composition of testing team, indicating the roles of the members;
- d) description of each tool attack in chronological order of events giving details of point of attack, tools used and time measurements;
- e) continuous video recording of the attacks;
- f) photographs of test sample taken before and after test; and
- g) list of tool used (with details specifications of make, capacity, weight, length etc).

8.2 The test results shall be reported in terms of observed networking time expressed in HH:MM:SS format.

Table 1 Criteria for Acceptance

(Clauses 6.1.4 and 7)

Sl No.	Class	Classification	Testing On		Criteria				Minimum Net Working Time in min
			Door	Body	Test Method	Test Tools	Opening cm ²		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
i)	D	Deposit safe (DEP 15D)	Yes	No	6.4.1 to 6.4.6	6.3.2			15
ii)	C	TL-30 (D) × TL-10 × 5 – FR 30	Yes	No					30
				No	Yes	6.4.1 to 6.4.5 & 6.4.9	6.3.3	39	10
iii)	CC	TL-15 × 6 – FR 30							15
iv)	CCC	TL-30 × 6 – FR 30	Yes	Yes					30
v)	BB	TRTL – 15 × 6	Yes	Yes					15
vi)	A	TRTL – 30 × 6							30
vii)	A+	TRTL – 45 × 6			6.4.1 to 6.4.7 & 6.4.9 Excluding 6.4.6	6.3.5			45
viii)	AA	TRTL – 60 × 6	Yes	Yes			13		60
ix)	AAA	TRTL – 90 × 6							90
x)	X	TXTL – 60 × 6			6.4.1 to 6.4.9 Excluding 6.4.6	6.3.3 & 6.3.6			60

NOTE — For those classifications that allow the use of a cutting torch, the quantity of gas consumed in any one test shall be limited to 28 m³ combined oxygen and acetylene gas.

ANNEX A

(Foreword)

COMMITTEE COMPOSITION

Security Equipments Sectional Committee, MED 24

<i>Organization</i>	<i>Representative(s)</i>
Reserve Bank of India, Mumbai	SHRI D. K. RAGHU (Chairman)
Bank of India, Mumbai	CAPT AKHILESH KUMAR
Central Building Research Institute, Roorkee	DR SUVIR SINGH DR RAJIV KUMAR (<i>Alternate</i>)
Central Bank of India, Mumbai	COL A. K. JHA
EMTAC Laboratories Private Limited, Hyderabad	SHRI SUPRIYO GANGULY
Godrej & Boyce Manufacturing Company Limited, Mumbai	SHRI PRASHANT CHOUTHAKANTHIWAR SHRI PUSHKAR GOKHALE (<i>Alternate</i>)
Guardwel Industries Private Limited, Mumbai	SHRI JOHN DMELLO SHRI LEON GEORGE (<i>Alternate</i>)
Gunnebo India Private Limited, Thane, Mumbai	SHRI R. SRINIVASAN SHRI ASHUTOSH SATPUTE (<i>Alternate</i>)
Indian Banks Association, Mumbai	SHRI K. UNNIKRISHNAN
Indian Overseas Bank, Chennai	CAPT P. VENKATESAN
Indian Institute of Technology, Bombay, Mumbai	PROF P. P. DATE
Insurance Regulatory and Development Authority, New Delhi	SHRI T. S. NAIK
Methodox Systems Limited, Indore	SHRI S. K. SINGH SHRI KARAN KATARIYA (<i>Alternate</i>)
NCR Corporation India Pvt Limited, Mumbai	SHRI A. SHANKAR
Punjab National Bank, New Delhi	CAPT B. K. TYAGI SHRI ARUN KUMAR (<i>Alternate</i>)
Safeage Security Products Private Limited, Mumbai	SHRI RAJAN VASANOI SHRI NARESH PANCHAL (<i>Alternate</i>)
Sherni Locks Manufactures Private Limited, Pune	SHRI FAROKH KUTAR SHRIMATI ARTI GUPTA (<i>Alternate</i>)
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